High School Exit Examination

Mathematics

Overhead Masters*

- Content standards to be covered
- Use of calculators; formulas provided
- Sample test items
- Standards being assessed

Updated December 15, 2000

** Taken from HSEE in Mathematics Teacher Guide: Part I*

Mathematics Revisions

- Revisions made in Overhead Masters since the November 14, 2000 edition in this document:

  Pages:

  - 2 – total number of test items updated
  - 40 thru 45 – (sample items) removed

HSEE Mathematics

Content standards to be covered:	Total Items
Grade 6–Statistics, Data Analysis, and Probability	6
Grade 7–Number Sense	14
Grade 7–Algebra and Functions	17
Grade 7–Measurement and Geometry	17
Grade 7–Statistics, Data Analysis and Probability	6
Grade 7–Mathematical Reasoning	8
Algebra I	12

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For the HSEE in Mathematics

- Calculators cannot be used
- Formulas will not be provided for the most common conversions but will be included for conversions between systems

Statistics, Data Analysis, and Probability (Grade 6)

3.3 Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if *P* is the probability of an event, 1-*P* is the probability of an event not occurring.

Sample Mathematics Item

Statistics, Data Analysis, and Probability (Grade 6)–3.3

- Rosella is rolling a numbered cube with the numbers 1 through 6 on it. She rolls the cube twice. What is the probability the two rolls will have a sum of 10?

A $\frac{1}{36}$

B $\frac{1}{12}$

C $\frac{1}{10}$

D $\frac{1}{9}$

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Statistics, Data Analysis, and Probability (Grade 7)

1.3 Understand the meaning of, and be able to compute the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.

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Sample Mathematics Item

Statistics, Data Analysis, and Probability (Grade 7)—1.3

- Twenty students took a math test. The upper quartile value of the test scores is the median of the

A top four scores.

B top five scores.

C top ten scores.

D middle five scores.

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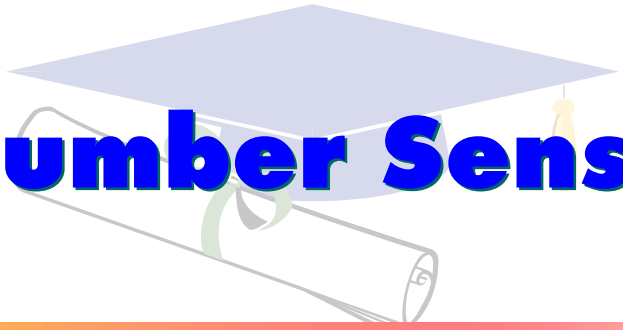

Number Sense

1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.

Sample Mathematics Item

Number Sense—1.3

- At a recent school play, 504 of the 840 seats were filled. What percent of the seats were <u>empty</u>?

A 33.6%

B 40%

C 50.4%

D 60%

Number Sense

1.6 Calculate the percentage of increases and decreases of a quantity.

Sample Mathematics Item

Number Sense—1.6

- Between 6:00 A.M. and noon, the temperature went from 45° to 90°. By what percentage did the temperature increase between 6:00 A.M. and noon?

A 45%

B 50%

C 55%

D 100%

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Number Sense

1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.

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Sample Mathematics Item

Number Sense—1.7

- Mr. Yee invested $2,000 in a savings account that pays an annual interest rate of 4% compounded twice a year. If Mr. Yee does not deposit or withdraw any money, how much will he have in the bank after one year?

A $2,080.00

B $2,080.80

C $2,160.00

D $2,163.20

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Number Sense

2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.

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Sample Mathematics Item

Number Sense—2.1

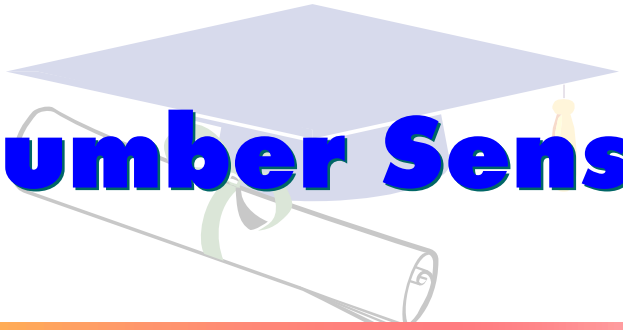
◆ $3^2 \cdot 3^{-3}$

A -3

B $\frac{1}{3^6}$

C $\frac{1}{3}$

D 3



Number Sense

2.2 Add and subtract fractions by using factoring to find common denominators.

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Sample Mathematics Item

Number Sense—2.2

- Which of the following can be used to compute $\frac{3}{4}+\frac{5}{6}$?

A $\frac{3+5}{4+6}$

B $\frac{3\cdot 3}{4\cdot 3}+\frac{5\cdot 2}{6\cdot 2}$

C $\frac{3}{4\cdot 3}+\frac{5}{6\cdot 2}$

D $\frac{3}{4\cdot 6}+\frac{5}{4\cdot 6}$

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Algebra and Functions

2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.

Sample Mathematics Item

Algebra and Functions–2.1

- Simplify the expression shown below

$2x^{-3}$

A $\frac{8}{x^3}$

B $(2x)^{-1}(2x)^{-1}(2x)^{-1}$

C $\frac{2}{x^3}$

D $\frac{1}{(2x)^3}$

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Algebra and Functions

4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solutions in the context from which they arose, and verify the reasonableness of the results.

Sample Mathematics Item

Algebra and Functions–4.1

- Before each game, the Harbor High Mudcats sell programs for $1.00 per program. To print the programs, the printer charges $60 plus $0.20 per program. How many programs does the team have to sell to make a profit of $200?

  A 250 programs

  B 300 programs

  C 325 programs

  D 350 programs

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Algebra and Functions

4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.

Sample Mathematics Item

Algebra and Functions–4.2

- A person drove for 6 hours at an average speed of 45 miles per hour (mph) and for 9 hours at an average speed of 55 mph. Find the average speed for the entire trip.

A 50 mph

B 51 mph

C 52 mph

D 53 mph

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Measurement and Geometry

1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).

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Sample Mathematics Item

Measurement and Geometry–1.1

- Order the following three speeds from fastest to slowest: 3,100 yd/hr, 160 ft/min, 9,200 ft/hr

A	9,200 ft/hr	3,100 yd/hr	160 ft/min
B	9,200 ft/hr	160 ft/min	3,100 yd/hr
C	160 ft/min	9,200 ft/hr	3,100 yd/hr
D	160 ft/min	3,100 yd/hr	9,200 ft/hr

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Measurement and Geometry

2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor.

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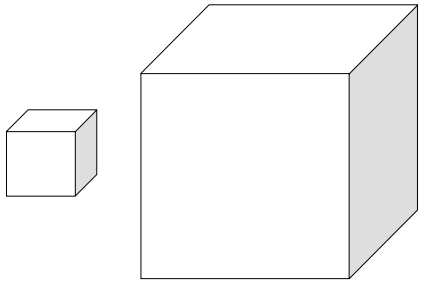
Sample Mathematics Item

Measurement and Geometry—2.3



- In the figure above, an edge of the larger cube is 3 times the edge of the smaller cube. What is the ratio of the surface area of the smaller cube to that of the larger cube?

A 1:3

B 1:9

C 1:12

D 1:27

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Measurement and Geometry

2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [$1ft^2$] = [$144in^2$], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in^3] = [16.38 cm^3].

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Sample Mathematics Item

Measurement and Geometry–2.4

- How many square feet are in 5 square yards?

A 15

B 25

C 45

D 60

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Mathematical Reasoning

2.4 Make and test conjectures by using both inductive and deductive reasoning.

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Sample Mathematics Item

Mathematical Reasoning—2.4

- While preparing for the local marathon, Angela made the following statements:

  If I do not stretch before the race, I will get muscle cramps.

  If I get muscle cramps, it will be to painful to run.

  If it is too painful to run, I will not finish the race.

Based on Angela's statements, what can be concluded?

A If she finishes the race, Angela stretched before the race.

B If she did not finish the race, Angela had painful muscle cramps.

C If she stretches before the race, Angela will finish the race.

D If she has muscle cramps, Angela did not stretch before the race.

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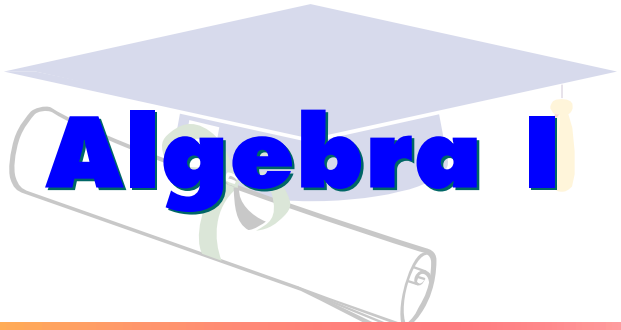

Algebra I

3.0 Students solve equations and inequalities involving absolute values.

Sample Mathematics Item

Algebra I–3.0

- Assume k is an integer and solve for k.

$10 - 2|k| > 4$

A $\{-3, -2, -1, 1, 2, 3\}$

B $\{-3, -2, -1, 0, 1, 2\}$

C $\{-2, -1, 0, 1, 2\}$

D $\{-2, -1, 1, 2, 3\}$

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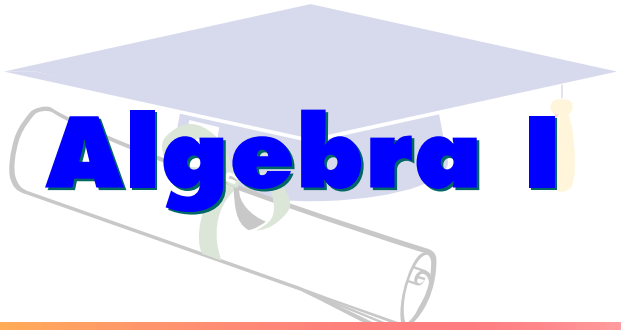

Algebra I

4.0 Students simplify expressions before solving linear equations and inequalities and in one variable, such as $3(2x - 5) + 4(x - 2) = 12$.

Sample Mathematics Item

Algebra I–4.0

- Which of the following is equivalent to $3x - (2 - x) < 2x - 5$?

A $3x - 2 - x < 2x - 5$

B $4x + 2 < 2x - 5$

C $4x - 2 < 2x - 5$

D $6x + x < 2x - 5$

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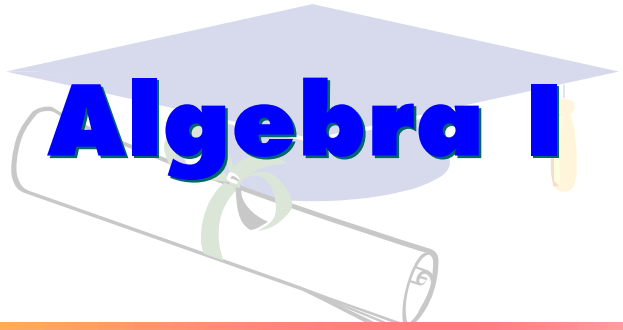

Algebra I

7.0 Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations.

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Sample Mathematics Item

Algebra I–7.0

- What is the equation of the line that includes the point (9, 3) and has a slope of $-\frac{4}{3}$?

A $y = 3x - \frac{4}{3}$

B $y = -\frac{4}{3}x + 13$

C $y = -\frac{4}{3}x + 15$

D $y = \frac{1}{3}x - \frac{4}{3}$

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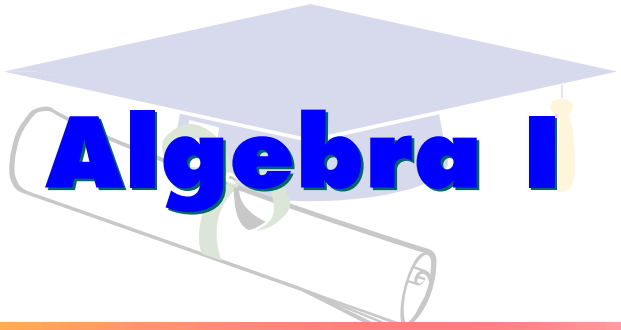


Algebra I

10.0 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.

Sample Mathematics Item

Algebra I–10.0

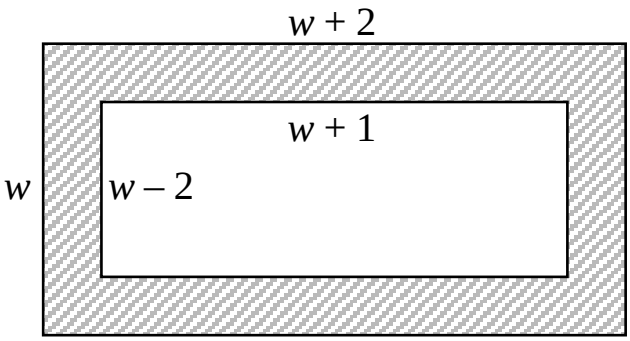
- The two rectangles below have dimensions as shown. Which of the following expressions represents the area of the shaded region?

A $3w + 2$

B $3w - 2$

C $w + 2$

D $w - 2$



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